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ABSTRACT

Presented are five papers on multidimensional teaching models presented at a workshop for professionals serving deaf-blind children. In "Interpretation of Visual Reports", M. Efron discusses procedures for improving visual diagnosis and provides a questionnaire format for an educationally oriented vision report. M. Marshall, in her paper entitled "Language Acquisition in the Severely Handicapped", describes and outlines the stages of an educational program for the severely handicapped student. The third paper, "Motor Development and the Classroom Teacher" (C. Stone), considers some general observations about and methods of working with both ambulatory and nonambulatory deaf-blind children. J. Waddell, the author of "The Interpretation of Audiological Evaluations", stresses the need for the teacher to understand all evaluative procedures and recommended rehabilitative measures in order to assist the deaf-blind child in developing to his fullest potential. In the final paper on "Behavior Management for the Deaf-Blind", J. Writer provides information on the following topics: the deaf-blind child as an individual, assessment of the child's current level of functioning, primary considerations in program planning, suggestions for motivating the child, considerations in the selection of classroom materials, and the child and his environment. (SB)

MULTI-DIMENSIONAL MODELS FOR TEACHING DEAF-BLIND CHILDREN

PROCEEDINGS FROM THE 2ND ANNUAL SPRING WORKSHOP FOR PROFESSIONALS SERVING DEAF-BLIND CHILDREN IN THE SOUTH ATLANTIC REGION - 1975

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INTERPRETATION OF VISUAL REPORTS

by

Marvin Efron, O. D., Ph.D

In order for the deaf-blind child to attain maximum benefit from his educational program, it is obvious that as much reliable information as possible concerning the child be made available to those who prescribe his curriculum and guide his experiences. No one doubts the importance of good visual diagnostic work and the notion need hardly be defended here. Nevertheless, inadequate, even quite erroneous diagnoses often are conducted by those dealing with deaf-blind children.

The present writer is of the opinion that the quality of visual diagnostic work performed with deaf-blind children could be improved substantially if a few straightforward procedures were followed. First, the teacher of the deaf-blind child must have an adequate understanding of the visual process and the general growth and developmental patterns of children. However carefully and competently a clinician may perform a vision examination, it can be of only limited use to the teacher with too little knowledge of the eye and the visual apparatus, thus preventing accurate interpretation of the resulting clinical vision report.

Minimally, the teacher should be thoroughly familiar with the structure of the eye, the muscles within and attached to the eye, and the visual pathways. The teacher should understand the function of each element of the vision system, both sensory and motor. In addition, the teacher should have some basic knowledge of ocular pathology and general pathology that has effect on the vision system. This basic knowledge of pathology would include descriptions of various common diseases with their symptoms, detection techniques, treatments, and prognoses. Especially important for the teacher to understand is the educational implications of the pathological condition of a student. Although the information suggested above for teachers may seem quite imposing, the knowledge and skills required can normally be gained in several graduate level courses.

While a knowledge of child growth and development is important to any teacher, such knowledge is particularly important to the teacher who must interpret clinical eye reports and use the information in designing instructional strategies. Suppose, for example, a teacher read a report that a particular child had had normal vision until he lost eighty percent of his vision at age six. The teacher must understand the principles of development well enough to realize that this child probably functions quite differently from one that had never had more than twenty percent of his vision.

There are levels of visual functioning that children pass through in a particular sequence. The deaf-blind child follows the same general pattern or development but much more slowly, less efficiently and many times with deviations. Naturally, his social, emotional, physical, and intellectual development are affected. It is essential that the teacher be able to assess a child's status with respect to these developmental levels if effective educational experiences are to be provided.

A second procedure necessary to improving vision diagnoses of deaf-blind children involves the clinical examination itself. Practioners often make the mistake of employing the same examination procedures with deaf-blind children that they use with more normal patients, and quite frequently this leads to faulty diagnosis. A low functioning, deaf-blind child simply does not adapt well or quickly to strange surroundings, strange persons, and strange handling. Clinicians often work within a pre-set time frame and there is not enough time for the deaf-blind patient to explore the examining office, adapt to the unfamiliar surroundings, and establish rapport with the clinician. It is essential that sufficient time be allowed for pre-examination familiarization if valid results are to be attained.

Once familiarization and rapport are established, it is most effective for the clinician to adapt his examining procedures to the child rather than the child to the procedures. For example, to attempt to seat a low functioning, multi-handicapped child in a chair and ask that he follow specific instructions can be very frustrating to the doctor as well as to the patient. In such case, it may be easier and more effective for the child to sit on the floor, perhaps with a parent or teacher, and for the clinician to slowly introduce lights in a playful or game-like fashion. The examiner may then gradually approach the patient for examination. As many of these children enjoy watching light, the technique is simplified.

By modifying his procedures to maximize the cooperation of the child, the clinician can accurately determine the extent of the ocular pathology and gain an objective measure of the refractive error.

As valuable as the results of such clinical examinations are, they are usually somewhat less than accurate in determining the functional skills of the deaf-blind child. The short span of time involved and the limited situation of even the most thorough clinical examination cannot reveal these skills. "Subjective" observations of the child over a period of weeks and even months are necessary to ascertain the client's functional levels, and these observations must be made under a variety of conditions and responses to various situations in familiar surroundings. Therefore, it would seem that the teacher is in a unique position to assist with the professional vision examination as it relates to the functional skills of the child. Being in a position to observe the child for long periods of time in a familiar setting and in various situations, the teacher is able to provide the clinician with information that is not otherwise available to him. This is particularly true of behavior that the child demonstrates only occasionally. For example, a clinician may diagnose a child as completely blind if he shows no reaction to light. But a very low functioning

child may exhibit a reaction to light only under certain conditions which the teacher has had opportunity to observe. This information obviously would be quite valuable to the clinician.

A third procedure related to the vision diagnosis is the obligation of the teacher to gain as much information as possible from the professional examination. Highly competent and quite complete vision reports often are not particularly oriented to the educational implications of the disorder involved. Therefore, the teacher can profit from requesting that the doctor, in addition to his professional report, complete a questionnaire that relates directly to the educational implications of the child's condition. A suggested format for such a questionnaire appears below.

Educationally-Oriented Vision Report

1. What is the cause of the visual impairment?

2. Is any special treatment required? If so, what is the general nature of the treatment?

3. Is the visual impairment likely to get worse, better, or stay the same?

4. Should the teacher be alert to any particular symptoms (such as eye rubbing, etc.) that would signal the need for professional attention?

5. What restrictions should be placed on the child's activities?

6. Should the child wear glasses or contact lens? If so, under what circumstances?

7. Were you able to determine an accurate visual acuity measure? If so, what was the visual acuity of the child?

8. If a visual acuity measure was not possible, what is your opinion regarding what the child sees?

9. Is the child's focusing ability and eye muscle balance adequate? If not, please describe.

10. Were you able to determine the field of vision? If so, were there areas of no vision in the field? Where?

11. Was the child able to follow visually a moving object? Were there directions in which he could not track moving objects? Which directions?

12. Will the child work better with large or with small objects and pictures? At what distances?

13. What lighting conditions would be optimal for his visual functioning?

14. What are your specific recommendations concerning this child's use of vision in learning situations?

15. When should this child be examined again?

In addition to written reports, the clinician will sometimes provide the teacher with supplemental oral information. The teacher should record these conversations for the child's records as well as classroom anecdotes that might provide insight into the child's disorder or developmental progress. At all times, the teacher should realize that a short eye examination can provide only a limited amount of reliable data concerning the visual functioning of the deaf-blind child. The teacher's job is one of constantly adding information through his own evaluations, subjective though they may be, to the pool of information available for planning the educational experiences of the deaf-blind child. If the teacher approaches his role to diagnosis in this manner, he will not only be better prepared to guide the learning of the child, but he can serve a valuable function as interpreter and counselor concerning vision problems to the parents of his students.

LANGUAGE ACQUISITION IN THE SEVERELY HANDICAPPED

By

Mary H. Marshall, Ph. D.

To plan and implement a language program for the severely handicapped, the teacher or clinician must have a thorough understanding of what the normal child would be expected to do as well as knowing the level of performance of the children in the language class. Knowledge of normal development includes understanding phonemic, syntactic and semantic aspects of language acquisition. Equally important is how the normal child uses his language system (the pragmatics of language development) which has particular significance for the teacher. Understanding of the children involves knowing the present levels of cognitive, physical, social and emotional performance in order to be able to integrate all activities of the total program and implement language training. By determining where the child is functioning in relation to the expected norm, the language program can be planned so to overlap with training in learning skills, motor skills, self-help skills and recreational activities.

A review of normal language acquisition is beyond the scope of this paper though the teacher of language different children must have a thorough understanding of this process. It should be remembered that the normal child learns early patterns of movement, intonational patterns and sequencing skills. His pre-linguistic behavior involves the development of listening skills and practice in vocalization. Before one year, the normally developing child responds to sound, turns to the source of sound, responds to no, bye-bye and environmental noise. He repeats syllables, imitates words, uses inflections, plays pat-a-cake and recognizes his name. Within one to two years a child learns body parts, identifies objects, follows simple commands, uses two-word sentences, increases the number of consonants and vowels used and listens to simple stories. By four years of age he is using most of the syntactical structures he will use as an adult. He has learned to use his language effectively by age five or six. This sequence of events gives basis and direction for planning a language program.

In teaching the severely handicapped child, the teacher must take the children through developmental stages and use a multisensory approach. Because of the varying types of handicaps encountered, the teacher must be innovative in adapting the steps of any program to the individual children. Sight, touch and hearing are used receptively and verbal and manual skills are used expressively. However, the content of the language program remains essentially the same. The program must be systematic and structured with daily goals broken down into small units using more success than failure though always moving to more difficult tasks each day or week. Specific objectives should be written after careful task analysis. (Task analysis involves identifying needed skills for the activity to be presented.) Program, instructional and supportive objectives should be written to insure the best

use of time and insure ways of evaluation and planning. Each objective should include six components, namely: when is it going to be done; who is going to do it; what is going to be done; to whom is it going to be done; criteria that will indicate accomplishment; and evaluation method used to determine if the objective has been carried out. (ASHA PDME Manual)

As has been indicated, the educational programs involve developing other skills, such as self-help and socialization, as well as language. The areas overlap though each should have specific goals. Because of the overlap, the language program should be a continuing, integrated part of the daily activities. Interaction with other children, a high level of stimulation, discipline, short activities and immediate rewards are important aspects of the overall program. The physical facilities must allow for movement and play. Good lighting and auditory training equipment should be provided as well as many audio-visual aids.

The daily schedule should be arranged to allow for activities alternating between requiring the child to be still with gross motor activities. The day's routine should remain stable so that the children will know what to expect and can associate times of the day with particular activities. Work in small groups is important to facilitate attention and interaction. Real experiences should be used to make language a meaningful activity.

Decisions relative to what will be taught are made after careful observation of the child to determine what he can do in order to determine what he needs to know. The teacher must select a reinforcer, a reinforcement schedule and determine how responses will be recorded. The program to be outlined below assumes that objectives will be written for each step as the program moves from inattention and little or no verbal behavior to a communication system useful for the child's environment. The end goal may take years to accomplish and for some children a few useful words may represent a communication system. It should be noted that any program is only as effective as the teacher or clinician who administers it and that it is necessary to change programs to meet the individual needs of the children involved.

The administration of the program involves controlled stimulus, recording of responses and immediate reinforcement of correct or near correct responses. Stimulus objects or materials, reinforcers and data collection sheets should be organized before the child is brought into the room. A baseline should be established for each stage of the program by administering all tasks for that stage before beginning. After the child has met criterion for each state, re-administration of the tasks provides a post-test. The baseline determines where the teacher should begin training.

Before any effective teaching can take place, the child must learn to pay attention. Much teaching time is lost if sufficient time is not spent developing attending skills; thus, the first stage of the program involves establishing sitting, looking and listening behavior. If the child has any distracting behaviors such as beating his head, kicking his feet, etc., these behaviors should be eliminated as a part of State I. Successful completion of the attending section is essential to all other aspects of the language program or any other learning program. It may be necessary to spend the first week or month (or more) of the program on these activities. It is not wasted time as the reinforcers used are learning oriented and begin developing language related skills. The children learn to sit in a chair, watch or listen to

the teacher and make a response, as well as eliminate distracting behaviors. The teacher must train herself to give only one repetition of a stimulus so that the need to attend will be established. More efficient learning will take place because time is not wasted in needless repetition and waiting.

Thus, Stage I is the Establishment of Attending Behavior. By using as reinforcers activities involving development of visual perception (matching of colors, shapes, objects), auditory response to sound (when child looks, he hears a sound), and visual-motor skills (building blocks, puzzles, drawing), other skills related to language acquisition are begun. Any objects used will later be a part of the core vocabulary to be taught in the receptive and expressive stages of the program.

In all stages of the program, the child is presented with a stimulus. If he responds correctly, the next item is presented. If he does not respond or responds incorrectly, a physical or verbal prompt is given and, through a shaping process, the child is guided to make a correct response on his own. The physical or verbal prompt is gradually faded.

It is expected that there will be at least four steps to Stage I (see outline). When the child has met criterion on all steps of State I, he is ready to enter the Imitation State of the program.

Stage II involves expanding the attending behavior by having the child imitate the teacher doing motor tasks. No language comprehension or expression is required. It is important that the child can point and carry out other responses in order to sucessfully complete other parts of the program. Usually, the child has already had some experience with this type of task in Stage I because he has manipulated the materials used as reinforcers. Examples of tasks to be imitated are: drawing a line on the board, rolling the ball, building a tower of blocks, and clapping hands. Ten different tasks should be chosen which are appropriate for the children to be taught. Physical or visual limitations may dictate items to be included in this stage of the program. When the child can complete 90% of the 10 items, he is ready to move to the receptive vocabulary stage of the program.

Because it is anticipated that the children will use verbal communication, if possible, Stage III involves imitation of sounds and words. Animals are used as a stimulus to encourage vowel imitation. If the child can stabalize four vowels, the teacher moves to consonant-vowel production, one syllable consonant-vowel, and consonant-vowel-consonant words. There is no final criterion for completion of State III, as verbalization will be encouraged throughout the program. Precise articulation is not expected. This stage will be begun simultaneously with Stage II. Only the completion of Stage II is required to move to the receptive stage (IV).

The purpose of Stage IV is to teach the children a basic, core vocabulary. The vocabulary is chosen on the basis of need, interest and function for the child and may vary for each child in the class. The vocabulary should include body parts; nouns familiar to the child's home and school environments, such as chair, table, box, cup, spoon; names of toys, such as boat, car, ball; words representing spatial relationships, such as on, in; colors; and adjectives, such as dirty, big, little. The initial list will include 15 to 20 words. The child is taught to respond to different commands involving the basic vocabulary and increasingly complex syntax and concepts. This stage involves seven basic steps which may need to be expanded for a child having difficulty with any step.

Step 1 of Stage IV involves identifying 10 nouns in response to such simple commands as "Show me the ____" or Point to the ____". Step 2 teaches identification of four body parts in response to "Show me your ____". In step 3 the nouns from step 1 are used in playing a game in which the child must find the objects on command. Step 4 expands both attention and memory as the child must "Give," "Show," or "Point to" two objects named by the teacher. Step 5 involves the body parts again, this time using a doll with the command "Point to the doll's or baby's ____". Step 6 teaches the concepts dirty, big and little in relation to the basic 10 nouns and involves 4 sub-steps, namely: identification of dirty plus the nouns, big plus the nouns, little plus the nouns and discrimination between the three adjectives plus the nouns using the commands already establsihed (show me, give me, point to, find). Step 7 involves spacial relationships and teaches the child to respond to the command "Put the ____ in or on the ____" by moving through 3 substeps to teach first in, then on and finally discrimination between the two prepositions.

At the beginning of the Stage, all skills to be taught are tested to determine where to begin. Ten stimulus are used in each step and sub-step and criterion for completion of each step is 90 accuracy in two successive presentations.

When the child has completed the Receptive Vocabulary Stage of the program he is ready to begin the Expressive Stage. All skills taught are practiced and reinforced in other activities during the day as well as in a structured play situation when planned activities help to generalize the skills which have been taught. This planned play time provides the teacher an opportunity to observe if the child is using the language skills presented in the program.

The Expressive Stage (V) of the program is designed to teach the child to use the core vocabulary in response to specific questions. The steps move from simply naming objects to answering with two word responses. As in the motor imitation stage of the program, prompts may be used so that the initial answers are imitative. The verbal prompt is gradually eliminated so that the child answers spontaneously. Exact articulation is not expected, though the response must be recognizable. The Stage involves five basic steps with a number of sub-steps as indicated:

Step 1 of Stage V involves teaching the child to name the 10 nouns established earlier receptively in response to the question "What is this?". Step 2 teaches the naming of body parts in response to the same question. Step 3 introduces a new question, "What do you want?"; and involves 6 sub-steps, namely, a one word response when two objects are presented, a one word response when five objects are presented, a two word response of "dirty ____" when two objects are presented, a two word response of "big ____" when two objects are presented, a two word response of "little ____" when two objects are presented, and a two word response discriminating between the three adjectives. Step 4 teaches two responses to the question "Where?" and involves 4 sub-steps in which the child is taught to answer "there" (or potentially "there ____"), "in" (or potentially "in ____"), "on" (or potentially "on ____") and to discriminate between in and on in response to the question "Where is the ____?". In Step 5 the child is taught to name an object that is missing in response to the question "What's gone?" or "What's missing?" (again potentially a two word response "____ gone").

At this point, the child is ready for expansion of both expressive and receptive language skills. Expansion should follow the process of normal language development. It should be remembered that the child is participating in this structured individually or small group presented program for 20 to 30 minutes, in verbal stimulation for 15 to 20 minutes, and in a structured group play session for 30 to 45 minutes, as well as the other activities of a total day program.

It should be noted that the expressive stage of the program can be used with the communication system being taught whether it be verbal or manual.

What is presented in this paper is obviously only an overview of the program. Questions concerning more detail are available upon request.

Outline of the Program

Stage I Attending Behavior

- Step 1 Sitting
- Step 2 Eliminating distracting behavior
- Step 3 Looking
- Step 4 Listening

Stage II Motor Imitation

Stage III Verbal Imitation

Stage IV Receptive Vocabulary

- Step 1 Identify 10 nouns
- Step 2 Identify 4 body parts
- Step 3 Find or show 10 nouns
- Step 4 Give teacher 2 nouns
- Step 5 Point to body parts on doll
- Step 6 Identify adjective plus noun
  - a. dirty ____
  - b. big ____
  - c. little ____
  - d. discriminate between dirty, big, little
- Step 7 Spacial Relationship
  - a. put object in box
  - b. put object on box, table
  - c. discriminate between in, on

Stage V Expressive Skills

- Step 1 Name nouns
- Step 2 Name body parts
- Step 3 Respond to "What do you want?"
  - a. name from two objects
  - b. name from five objects
  - c. dirty ____
  - d. big ____
  - e. little ____
  - f. discriminate in, on

Step 4 Respond to "Where?"
a. there ____
b. in ____
c. on ____
d. discriminate in, on

Step 5 Respond to "What's missing?"

MOTOR DEVELOPMENT AND THE CLASSROOM TEACHER

By

Cynthia L. Stone, L.P.T.

In discussing motor development in deaf-blind children, I would like to make some general observations about both ambulatory and non-ambulatory children, and then divide the two groups up as they present specific problems.

Movement is the outward response of man to his environment. We are unable to delve into man's brain to see what he is thinking; we can only observe Him by his actions. Movement therefore is not just a physical skill, but has purposeful meaning and may express language, emotion, and living. Motor development is not a separate entity from all the other developmental processes in the child. His language, socialization, visual and auditory development are all intertwined in this developmental process. We cannot separate a child's movement repertoire from his total being, because it is an expression of his total being.

How does this concept of totality relate to the child who is sensorially impaired? His sensory impairments don't stop at the periphery. The crux of the problem is lack of organization and ability to integrate sensory input to produce an organized motor output with meaning. The teacher in the classroom is the intervener. She must be able to first observe and evaluate the child in his environmental interactions, see how he is using what he has, and then plan and implement an educational program to assist him in developing in a more organized, functional manner.

The Non-Ambulatory Deaf-Blind Child

In working with the non-ambulatory child, the teacher is confronted with another impairment, that of motor dysfunction. The child may be merely developmentally delayed due to lack of environmental experiences or he may have motor impairment due to central nervous system damage.

Having a physical therapist or occupational therapist as a consultant on the teaching team is imperative for effective management of the child. Effective intervention in general handling and program planning to meet the child's needs calls for assistance from these disciplines.

Before going into basic handling techniques for positioning, feeding, dressing, and into developmental activities to improve basic motor functioning, it is necessary to first discuss normal motor development in general.

Normal Motor Development

Normal motor development progresses through the maturation of the central nervous system and through environmental experiences. In the child that is both physically and sensorially impaired, both of these processes are affected and the child's interaction with his environment is greatly distorted.

The newborn is governed totally by reflex activity and, through this activity, his basic needs for survival are governed. The sucking reflex allows the child to gain nourishment as an automatic response to anything put into his mouth. He is completely dependent upon his caregiver for all his needs, as he has no motor control over his body. Motor control is acquired in a sequential manner, through the integration of primitive reflex activity which first governs all his movements and the simultaneous development of the normal postural reflex mechanism. The normal postural reflex mechanism is made up of the righting reactions which get us up and turn us around, the equilibrium reactions which maintain our position in space, and normal postural tone which is low enough to allow for movement and high enough to maintain posture. The development of the normal postural reflex mechanism creates trunk strength and trunk mobility which is the basis for all movement patterns.

The non-ambulatory deaf-blind child has not developed the trunk strength and trunk mobility needed for erect posture and ambulation. He has maintained the primitive reflex activity which controls his movement patterns.

Positioning and Handling

Two areas of concern need to be dealt with in planning and implementing educational programming for the child. One is the proper positioning for the child in all routine activities of the day to prevent contractures and deformities. Because he is unable to move in a coordinated manner, the child many times stays in the position that he was placed in for hours on end. His head may be turned to one side constantly, and his trunk will become assymetrical through lack of position change. The key to positioning is observation of the trunk. All movement originates from the trunk. The head, arms and legs are all attached to the trunk. We adults are never in the same position for more than twenty minutes at a time; we are constantly changing our body positioning and this must be taken into consideration with these children. Through adaptive equipment we can facilitate correct positioning for these children. This change in positioning also gives them the opportunity to view the world from different perspectives.

Handling techniques are also very important. They effect the security the child feels and they also effect his motor response. When a child is picked up he should always be supported at his shoulders and his hips, so that his trunk remains symmetrical, and abnormal postural tone is minimized. The key to all handling is trunk rotation from the shoulders or the hips. Instead of picking the child up straight off the mat, first rotate him up to a sitting position so as to allow him a more normal movement experience. Also, waiting for the child to respond to the movement is important. We are trying to develop postural adjustments to changing his position. We want to

give him the opportunity to move in a more normal manner. We want to guide his movements, not perform them for him. In carrying the child, we must also think of trunk symmetry and postural control. Too often we tend to hold them like newborns and fail to give them the opportunity to adjust their bodies to changing positions. Each child has individual characteristics to his motor problems; therefore, the child's motor program must have individual goals and objectives. However, trunk symmetry and trunk mobility are an integral part in all motor programs. We must start the child where he is and set up realistic objectives to help him develop to his fullest.

Developmental Activities

Children do not completely attain one developmental level before moving on to the next level of motor performance. A child may not have complete head control on his stomach, and yet, on his back, he may begin visual tracking and batting at objects dangling in front of him. A six month old baby may be able to sit up propped on the corner of the couch or roll over in either direction, but also be capable of playing bouncing games on his feet while supported. He needs to have a variety of experiences to develop motor skills necessary for standing alone and walking. At the same time, however, these normal motor experiences may be detrimental to the motorically impaired child. They may increase his abnormal movement patterns. The O.T. or P.T. consultant will be able to help in programming for the individual child's special needs.

Conslusion

The non-ambulatory child presents specific motor problems that need the consultation of therapists specialized in this area. A thorough understanding of normal motor development is a necessity for the teacher in dealing with these children. Trunk symmetry and mobility are keys to developing more normal movement patterns. Proper positioning in the classroom and the home can greatly alleviate the development of deformities.

The Ambulatory Deaf-Blind Child

Once a child has acquired upright posture and ambulation, what are the factors involved in improved motor functioning and the gaining of basic skills of jumping, galloping, skipping and throwing balls? There is of course the further maturation of balance reactions. But, along with this maturation, and equally important, is development of socialization skills and peer interaction. The ambulatory deaf-blind child is almost always severely delayed socially. In a review of the socialization abilities of 187 deaf-blind children evaluated in September, 1974 on the Callier-Azusa Scale, only 24 were functioning at a 24 month level of parallel play activities and 12 were functioning at a 48 month level of interactive play. Not only is delayed socialization a factor in lack of basic skill development, but also visual and auditory impairments have a great effect on balance abilities and movement through space. In evaluating gross motor performance in ambulatory deaf-blind children, once again the total child must be taken into consideration. Because they have no intrinsic reinforcement for acquiring basic skills, their fulfillment many times is seen in self-stimulatory activities of balancing on tables

and tripoding while light playing. They use their repertoire of motor movements to direct all their attention to their own body. Because of this inner body direction, the child does not anticipate and does not respond to the environment. One of the main goals in gross motor activity planning then is to teach the child that he is separate from his environment, that he has a body and that it has definite boundaries, and that once he has developed these boundaries he can learn to move through space in a meaningful manner. Activities directed to develop body image and movement through space should be emphasized. Build upon the child's repertoire of movements before going into basic splinter skills. Set up circuits of obstacle courses that the child follows in a sequential manner. Keep the same circuit until the child feels comfortable and then change it or add to it. Have group mat activities where all the children are lined up to watch each other perform. Children attend to movement and in a structured situation will pick up much imitation from their peers. Structure, planning, and continuity are the key words to setting up gross motor programs. The child then is given the chance to organize his sensory input to produce a more organized motor output. Body rhythm activities can also be very useful for development of body image and movement through space. Music can be utilized for creative movement, teaching concepts of slow and fast, and for many imitations and movement games.

Conclusion

The development of a gross motor program for deaf-blind children has a much broader scope than merely the acquisition of basic skills. Through movement activities that have structure, planning, and continuity, the child will learn to define himself as separate from his environment, and that he can learn about his environment from a motor base, which will give him a better foundation for organizing and developing his total being.

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THE INTERPRETATION OF AUDIOLOGICAL EVALUATIONS

By

Judith Schmitt Waddell

The evaluation of a child's hearing acuity often presents a challenging problem to the audiologist. Children with multiple problems such as mental retardation, emotional disorders, cortical dysfunction, and what we are interested in--a combination of primarily visual and hearing impairments, make differential diagnosis difficult and requires observation and evaluation of the child's auditory behavior in light of his total behavioral pattern. In the deaf-blind child, communicative problems resulting from the hearing impairment are complicated primarily by the visual disorder. A comprehensive evaluation is necessary to determine the nature, degree, and significance of the hearing loss. Appropriate recommendations regarding otological referrals, educational placement and rehabilitative measures are then made in conjunction with the findings and recommendations of other professional consultants working with the child.

It is important to review the procedures utilized in audiological evaluations so that you have a better understanding of the basis on which the recommendations for audiological management are made.

The diagnostic evaluation actually begins prior to the time the audiologist sees the child. Reports from other professional sources such as physicians (neurologists, pediatricians, ophthalmologists, etc.), social workers and speech pathologists often provide the framework from which the audiologist works to analyze the child's auditory behavior. It is important to have on hand pertinent information regarding the child's prenatal, natal, post-natal, developmental, medical and familial history, in addition to general behavioral observations. Additionally, the case history can assist in the diagnostic procedure in determining the etiology, age of onset and severity of the loss.

Particularly with the deaf-blind child, the reported history of maternal rubella would lead us to be alert to the possibility of sensorineural hearing loss. Maternal rubella is the most oft cited etiology in connection with the deaf-blind child. Other disabilities such as cardiac malfunctioning, mental retardation, and brain dysfunction are associated with the syndrome. The rubella epidemic of 1964-65 has produced an exceptionally large number (over 20,000) children who are disabled as a result of the infection. The stage of pregnancy in which the infection was contracted may be related to the resulting disorders. The first trimester of the pregnancy is generally considered to be the most critical for the development of the auditory mechanism of the fetus. We now know that the ear may be damaged in any month of pregnancy, and if the rubella virus is still active in the infant, it may destroy the auditory mechanism any time following birth (Bergstrom, 1974). Bergstrom noted that the direct infection of the inner ear is usually caused by the rubella virus. It appears that although there is a loss of hair cells and contact between the tectorial membrane and hair cells may not occur, the nerves and ganglion are

unaffected (Bergstrom, 1974). If this in fact is the case, it may be possible for these children to use their residual hearing. This is important when we consider the prospects for amplification and an auditory training program for the child.

Discussion and observation of the child's behavior (particularly auditory) while interacting with his parents and others, can be essential in making a meaningful diagnosis. With complicating factors, such as inconsistent behavior, withdrawal, constant rocking, distractibility or hyperactivity, auditory responses obtained may not be indicative of actual acuity levels.

The choice of test procedures is based on the behavior exhibited and the approximate mental age or functioning level of the child. A six year old severely retarded child cannot be expected to respond in a manner similar to that of a "normal" intellectually functioning child. If his behavior is on the level of a two-year old child, the testing should be structured as if evaluating a two-year old. This holds true for the deaf-blind child. On one hand, there are those who are functioning on a very low level, while on the other hand a few may actually be intergrated into a normal classroom.

In the very young child, auditory functioning is assessed by means of observational audiometry. Auditory stimuli such as live voice (speech signals), familiar environmental sounds, toy noisemakers, warbled tones, white, sawtooth, and narrow band noise are introduced into the sound field environment and observations are made of the child's behavior. Responses such as eye-widening and blinking, startle, searching for sound source, vocalization, etc. are recorded at the initiating intensity level. It is always important to be aware of the fact that with toy noisemakers or other stimuli with undefined frequency characteristics, a response will be observed to that stimulus if the child has normal or near normal hearing in any frequency range which is contained in the sound energy of the noisemaker (Miller, Polisar, 1964). Usually pure tones will elicit the poorest response, whereas more complex stimuli and speech appear to be more successful. The behavior observed would be evaluated in reference to the child's age and state of alertness.

As the child grows older other behavioral changes can be observed. More importantly, these may occur at low loudness levels. Vocalizations (including crying) may be noted in imitation of the examiner of initiated by the child, such as "oh-oh", "ma-ma". Intonational and inflectional imitation may be other signs of response to auditory stimulation.

In addition to observational audiometry, visual reinforcement and audiometry or conditioned orientation reflex (COR) techniques can be utilized to obtain more definitive information about the child's hearing acuity, assuming that the child alerts to a light (visual) stimulus. The child is conditioned to associate the appearance of a light with the initiation of an auditory stimulus. If conditioning is successful, the child will seek out the light when the sound is presented. He is then reinforced with a light presentation. With COR, a localization response is sought since multiple loudspeakers and visual stimuli are used only as a means of reinforcement (Newby, 1972).

Sound field testing results essentially reflect the status hearing

acuity binaurally. We can describe our findings as representative of the "better ear".

In some instances, pure tone audiometric testing can yield definitive results. To achieve reliable, valid results, test procedures with most young children require conditioning to respond to the task. Some type of play audiometric activity, such as dropping a block in a box, pointing to the appropriate ear, verbalizing, etc. is used to maintain his interest in the task at hand. The examiner can be creative in devising his own techniques according to the needs of each child.

In pure tone audiometry, we obtain an estimate of the child's hearing acuity by determining the intensity level at which a tone is detected 50% of the time (threshold), for each frequency (pitch) measured. Thresholds are obtained for each ear independently. Air conduction (tone presented through the earphones, travels through the outer, middle and inner ear) and bone conduction (in this case vibrations of the temporal bone stimulate the inner ear) tests are usually performed to determine the nature and extent of the hearing loss.

If possible, speech audiometry is employed to measure the child's ability to respond to speech stimuli. Measurements of the level (speech reception threshold) at which the child can understand 50% of the words are obtained. In most of the children seen, this is not possible due to the lack of speech and language development or severity of the hearing loss; therefore a speech detection threshold is obtained. This measurement identifies the level at which the speech discrimination scores cannot be obtained. This measurement is an indication of the degree of impairment in understanding what is heard--how intelligible speech is.

Basically only objective measurements of hearing acuity can provide us with reliable information concerning the child. This type of testing does not require an active response on the part of the child. A majority of the children with whom you work can be placed into this category. When responses are obtained subjectively, it is also important that they be confirmed by other means.

One of the most frequently utilized means of objective hearing testing today is impedance audiometry. The principles underlying the procedure and the clinical technique were reported in 1946 and put into use in Scandanavia. It has only been within the last five years or so that it has become a part of the routine hearing evaluation battery. Northern and Downs (1974) define impedance audiometry as an "objective means of assessing the integrity and functioning of the peripheral auditory mechanism". The relationship between the sound pressure level of a 220 Hz probe tone and the volume of a closed cavity, in this case the external auditory canal, is the principle upon which this technique is based. For further explanation of the principle, you may check any of the more recent audiology publications. For the purposes of this paper, efforts will be made to describe briefly the test procedure used by audiologists and the significance of the results.

A headset, connected to the impedance audiometer, has an earphone (as you would find on an audiometer) on one side with a probe attachment on the

opposite side. The probe tip on the attachment has three holes--one through which a 220 Hz probe tone enters the ear canal, the second controls the changing air pressure in the enclosed cavity, and the third is a microphone which monitors the SPL of the probe tone in the canal with various changes in air pressure. A cuff is placed on the probe tip, depending on the size of the ear canal, and the probe is inserted in the ear canal forming an air tight seal.

There are three basic measurements which comprise the impedance test battery-tympanometry, static compliance, and the acoustic (or stapedial) reflex. Although each is significant in and of itself, more diagnostic information is obtained when the results of the measurements are considered together.

The first test procedure that we are concerned with is tympanometry. It is a measurement of the change in tympanic membrane stiffness, under various air pressures. In other words, it determines the compliance or mobility of the tympanic membrane with changes in air pressure. This is important clinically since the tympanic membrane forms one boundary of the middle ear system. Any pathology of this system will be reflected in the mobility of the tympanic membrane and/or changes in the air pressure of the middle ear system. The maximum compliance of the tympanic membrane can be found when air pressure in the middle ear is the same as that in the external auditory canal. The tympanogram is used to record the compliance changes occuring with different middle ear pressures. Research has determined a "normal range". This range is indicated by the shadowed curve on the tympanogram.

A classification system of patterns has been devised. Basically five patterns are described: Types A, A_S, A_D, B, and C. A type A tympanogram is indicative of a normally functioning middle ear system. The curve peaks at the point of maximum compliance. There has been some disagreement as to the exact limits of normal middle ear pressure, although general guidelines have been suggested. The clinical judgement of the evaluator will decide the significance of the results in each situation. Type A_S tympanograms reflect normal middle ear pressure with reduced mobility of the eardrum. We often see this type of tympanogram with otosclerosis, tympanosclerosis, and scarred tympanic membranes. An extremely flaccid eardrum is represented by the type A_D tympanogram, in which a greater than normal compliance of the eardrum is seen. A disarticulation of the ossicular chain is indicated when the maximum compliance is not reached even with a change in sensitivity setting on the impedance audiometer. The type B tympanogram reveals no change in the mobility of the tympanic membrane, with variations in air pressure. This is usually consistent with cases of serous and adhesive otitis media or some middle ear malformations. It is important to be aware of the fact that this tympanogram may also be found in individuals whose external ear canals are occluded with cerumen. In cases where it is feasible, the wax should be removed prior to testing. Type C tympanograms display "normal" compliance of the tympanic membrane with a negative middle ear pressure usually of -150 or -200 mmWS or less. These curves may or may not be indicative of fluid in the middle ear. It can also suggest poor Eustachian tube function (Eustachian tub incompetency), particularly in children with frequent upper respiratory infections. Children with type C

tympanograms should be followed because of the possibility of impending secretory otitis media. Even without fluid, a mild conductive hearing loss may be present with pathologic negative pressure.

With tympanometry, procedures may be utilized to determine Eustachian tube functioning and the presence of a perforated tympanic membrane.

As was previously noted, with all of these there can be associated conductive hearing loss, although not in all instances is the degree of the loss consistent with the results of tympanometry.

The static compliance measurement is arrived at by taking measures of the cavity volume of the middle ear system with the tympanic membrane at its least and most compliant pressure conditions. By subtracting the measurements obtained, it is then possible to arrive at a measurement of the static compliance of the middle ear system itself without including the volume of the external ear canal. Through research it has been found that the measurements may be divided into ranges associated with various ear pathologies. It has been shown though that there is a great deal of overlap among various pathologies. In addition, results obtained with children do not always fall within the predicted range. Results are generally too variable to be significant in and of themselves. This test is the weakest component of the battery and should be considered only in light of the other measurements.

The acoustic reflex measurement is the third portion of the test battery. It is known that a sufficiently loud auditory stimulus can cause the stapedius muscle to contract. In this test, we are looking for the threshold level at which this contraction occurs. In normals, contraction has been observed with pure tone stimuli between 70 and 100 dB HTL and white noise stimuli at about 65 dB HTL. With cochlear pathology and recruitment present, these levels may be lower. When a conductive hearing loss of sufficient degree (25-30 dB), unilateral or bilateral, this reflex is obscured and absent bilaterally upon testing. With a unilateral hearing loss not exceeding 80 dB reflexes will be present, but with a unilateral loss greater than this, the reflex will be absent when the earphone is on the impaired ear. With absent reflexes, normal tympanometry and static compliance bilaterally, a severe sensorineural loss is suggested. Northern and Downs (1974) also note that in some brain damaged children, a reflex cannot be elicited even in the presence of normal hearing.

As was pointed out earlier, more important diagnostic information can be gleaned from the results when they are taken into consideration together. Information can be obtained suggesting that a medical referral is necessary. This is particularly important for a child who has a severe hearing loss. The audiogram in this case would not be of assistance in detecting a conductive loss. It is obviously also important if only sound field test results are available. Tolerance problems with amplification may be confirmed using the stapedial reflex.

There are other objective tests which can be utilized, such as EDA, ERA, heart rate response, although they are not frequently found in all

clinical facilities due to financial, spatial, or other limitations.

Up to this point the discussion has centered around the means of detecting the efficiency of the peripheral auditory mechanism. Many deaf-blind children have auditory perceptual difficulties, in which the incoming sounds or auditory stimuli are not processed on a cortical level. This processing involves a response to, organization, and comprehension of sound--awareness, localizing, discriminating, sequencing, synthesizing, memory, classifying, and intergrating. All of these functions are interrelated. This is the child who may have normal hearing acuity and hears what is said, but is unable to interpret what is said. The expressive language skills are affected. Degree of impairment varies from child to child. This is a child who also would not benefit from amplification. Unfortunately, although audiologists are aware of these problems and some tests are available to identify central auditory problems, much research is still needed to investigate the many problems that exist in understanding and assessing central auditory functioning.

Audiologic reports often describe a child's responses to various types of stimuli. You must remember though that these evaluations are usually conducted in a totally unfamiliar environment. This is often reflected in the response pattern elicited. The observations of parents, teachers and other individuals can also be helpful in determining the validity of the results or the need for further testing prior to making a diagnosis.

Now that the evaluation is completed, it must be determined what the results reveal about the nature and degree of the loss, and generally how we can expect the child to function.

The audiogram is a graphic representation of the individual's hearing thresholds for each ear, measured in decibels, at particular frequencies. The air conduction thresholds represent the overall functioning of the outer, middle and inner ears. Damage to any of these structures will be reflected in these thresholds. Results of bone conduction testing will indicate any problems in the sensorineural mechanism--inner ear or eighth nerve. By comparing the air and bone conduction thresholds in each ear, we are able to determine if the loss is conductive, sensorineural, or mixed. With conductive losses, the bone conduction thresholds will be within normal range, with air conduction thresholds indicating a loss of acuity. This would suggest damage to the outer and/or middle ear. If the air and bone conduction thresholds are depressed equally, a sensorineural hearing loss is indicated, in which the damage is to the cochlea or eighth nerve. It is possible also to have a mixed hearing loss, one in which damage both to the conductive and sensorineural mechanism is evident.

When a conductive or mixed loss is found, a referral to an otologist is made in order to diagnose and treat the underlying pathology. With the use of impedance audiometry more diagnostic information can be provided to the otologist. It is also beneficial in detecting the presence of middle ear pathology in individuals with severe or profound sensorineural hearing losses. In these cases, with the limitations imposed by the intensity output of the bone conduction oscillator, pure tone audiometry is not sufficient in determining the existence of the overlying conductive component.

The degrees of hearing loss have been described in various ways--mild, moderate, moderately severe, severe and profound. Studies conducted in recent years seem to indicate that a majority of children having hearing losses as a result of maternal rubella will fall into the moderately-severe to profound categories. Some mild-moderate hearing losses also have been diagnosed in this population. The tendency though is toward a more profound loss. Although reports vary as to whether or not a typical audiometric configuration exists, most of the literature indicates that one is not found consistently upon testing. Many of the audiograms display a falling contour, where hearing loss becomes progressively greater in the higher frequency range with slightly better threshold levels in the low and high frequencies. Essentially flat configurations and those with a greater loss in the low frequencies, of course, have also been observed (Borton, Stark, 1971).

Although pure tone testing alone is not always indicative of the effect the hearing loss has on the intelligibility of speech for each individual, we are able to estimate the sensitivity level for the reception of speech from the pure tone averages of the speech frequencies (500 Hz, 1000 Hz, 2000 Hz). These frequencies have been defined as such because most of the acoustic energy for the intelligibility of speech is found within this frequency range. With a sharply sloping audiometric configuration, the average of the thresholds at 500 Hz and 1000 Hz are more accurately indicative of the speech reception threshold. Spondaic words (used to obtain an SRT) are heavily weighted with vowels, whose acoustic energy is concentrated in the low frequencies. Speech discrimination or intelligibility is dependent upon consonant sounds. Most of their acoustic energy is in the higher frequencies. Generally speaking, they also have less energy than do vowels.

Usually audiograms are more representative of what cannot be heard rather than what can. Individuals with similar audiograms may function differently in discriminating speech. Audiograms also lack the ability to describe an individual's capability of recognizing and perceiving elements in relation to the dimension of time--the rate and duration of utterances, which is important to auditory perception. We can make judgments though regarding what type of frequency distortion for speech may exist by determining the degree and pattern of the loss, taking into consideration residual hearing.

In the rehabilitation of any child, particularly the deaf-blind child, amplification should be considered. The professional responsible for the audiological management of the child will determine the need for and the appropriate type of amplification. The audiologist will take into account observations regarding the child's behavior made by those working with the child on a daily basis. Most children should be given a trial period of amplification. With deaf-blind children, binaural amplification is highly recommended. Binaural amplification has many advantages over a monaural fitting including improved localization of sound, improved ability to select a signal from a competing background of noises, ability to identify and recognize common environmental sounds, and better speech discrimination under poor listening conditions (Miller, 1972). Since one of the most important skills a deaf-blind child can develop is localization, the need for binaural amplification is obvious.

In evaluating the benefits of the hearing aid, comparison can be made between the results of an aided sound field audiogram with the unaided results to determine the improvement in sensitivity to sound the instrument provides. If possible, responses to warbled tones may give some indication of the frequency range within which the child may be perceiving sound. This is obviously done in addition to obtaining a speech detection (or reception) threshold.

A brief note--it is essential that the children achieve optimal benefit from the aid; thus a daily hearing aid checklist should be devised to be certain that the aid is functioning properly.

The use of auditory training units, whether they be individual or classroom, loop or FM systems, should also be considered, and the choice be determined by the needs of your particular program.

An important consideration that we often overlook is the acoustics of the classroom in relation to speech intelligibility. We are aware of the problems with speech intelligibility that the child is experiencing by virtue of his hearing loss. Despite the advantages of amplification we must also consider the amount of distortion produced by hearing aids. A classroom should be sufficiently quiet to allow the teacher's voice to be heard. In addition the intensity ratio at the child's ear between the instructor's voice and room noise (ambient and reverberant) is important. Generally the closer the teacher is to the child, particularly in a poor acoustic environment, the better the intelligibility. Carpeting, acoustic tiling, drapes, and lining the door frames with rubber for a tighter seal, may help (Katz, 1972).

Amplification is critical in helping a child to develop his potential for communication through the auditory channel. This potential includes the development of a child's relationship between himself and his environment, receiving warning and danger signals, enjoying auditory stimulation, such as music and environmental sounds, and for development of an awareness of his own vocalizations in the overall development of speech and language skills.

In developing an auditory training program, you must keep in mind the individual child, as well as the fact that it is not a separate rehabilitative measure, but a part of his overall language development program.

Regardless of the degree of hearing loss, with amplification a child has the opportunity to become aware of many environmental sounds which were not audible to him before. Exposing him to various types of auditory stimuli throughout the day is important. Developing an awareness of sound is a basic concept in an auditory training program. You must remember though he is now being bombarded by sounds he has not heard before, so his "auditory world" must be structured so that he is able to obtain as much information as he can from the stimuli he is receiving. Activities appropriate for the child should be designed to create an interest in listening to sounds, particular to his environment. We know that sound is attended to more often when it has meaning for us. Sounds associated with daily living activities, such as feeding, dressing, bathing, etc., in initial activities will be more meaningful. With the deaf-blind child we must compensate for the visual handicap by using tactile, kinesthetic, gustatory, etc. clues in conjunction with sound.

It is also necessary to attend to and discriminate between warning signals such as bells, sirens and horns. Associated with this behavior is searching and locating the source of sound. This is a particularly critical skill for the deaf-blind child. An appropriate schedule of reinforcing correct responses is necessary.

Utilizing vibro-tactile and auditory sensations in music therapy the child learns to discriminate among differences in pitch, loudness, stress and rhythmic patterns which are essential to the perception of speech. Often children with usable residual hearing only in the lower frequencies depend on stress, rhythm and intonational patterns for identifying and associating meaning with acoustic stimuli.

Carryover into language activities may be made. Listening and discrimination skills are developed, and vocalization and babbling responses are stimulated. Meaning is established between an action or object and its verbal symbol, and a basic vocabulary is developed.

Later goals in auditory training involve the discrimination of vowel and consonant sounds in various syllabic combinations, and in word and sentence units.

For many deaf-blind children only the basic auditory skills of awareness and gross discrimination will be developed. For others some degree of proficiency will be attained in developing receptive and expressive language and speech skills. Setting reasonable short and long term goals is important.

It is important that professionals working with the deaf-blind child have a basic understanding of all evaluative procedures and recommended rehabilitative measures, in order to assist the deaf-blind child in developing his potential to the fullest.

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BEHAVIOR MANAGEMENT FOR THE DEAF-BLIND

by

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It is the goal of this paper to provide teachers, aides, and support personnel who work with deaf-blind children and youth with basic techniques for managing their students' behavior through appropriate observation, evaluation, program planning, and environmental control. Emphasis will be placed upon the individuality of each deaf-blind child and the importance of developing his level of functioning through the use of those techniques and materials most relevant to him. Information will be discussed within the following format:

1. Introduction to the deaf-blind child as an individual
2. Assessment of the child's current level of functioning
3. Primary considerations in program planning
4. Suggestions for motivating the child
5. Considerations in the selection of classroom materials
6. The child and his environment

INTRODUCTION

In recent years, changing professional attitudes have influenced movement away from a perpetual search for the way, the only way, the best way of educating deaf-blind children toward recognizing that there are no cookbooks or panaceas. The deaf-blind child is first a child and then a child who has a problem. He is an individual. It is not only a matter of "different strokes for different folks," but the recognition of the fact that what works for a given child today may or may not work for that same child tomorrow.

The concept of the "child as his own curriculum guide" implies that each deaf-blind child requires a sequence of activities and variety of techniques for the remediation of his problems which are different from those required by any other individual (Hammer, 1974:8). Hence, programs need to be planned for the child, rather than the all too common practice of trying to plan the child to fit an already established program. Situations should be offered to the child which will enhance his movement from a level of dependent functioning to a level of greater independent functioning. The most flexible application of this theory would be for the educator to "start where the child is and let him take you where he will go," (Hammer, 1975).

Just as the deaf-blind child is an individual, so are the educators who work with him. There are no experts in our field of education in the sense that no one person knows all there is to know about educating the deaf-blind. It is also relatively safe to assume that no one person can be all things to all children at all times. Fortunately, in recent years, the classroom door has begun to swing open and a team approach to learning is rapidly replacing the old "my child - your child" syndrome. Teachers, aides, parents, and support personnel are beginning to work together in the design and implementation of effective programs to meet the needs of individual children and their families. The inclusion of the child's parents on the planning team has proven especially effective for program development and carryover. A comprehensive educational program demands this form of interaction. It must be remembered that the educator works with the child for only six hours a day; whereas, the parents have responsibility for him eighteen hours a day. The same principal holds true for the dormitory parents and attendants of the deaf-blind child in the residential setting. No one has all the answers. It is done together.

ASSESSING THE CHILD'S CURRENT LEVEL OF FUNCTIONING

There are many different techniques currently being used to assess the functioning levels of deaf-blind children and youth. The Callier-Azusa Scale (1975), the Curtis and Donlon Tele diagnostic Protocol(1974), and the Efron and Duboff Teachers Guide for Evaluating Vision Functioning (1975) are just a few examples of the new multi-modical and categorical assessment tools employed. The commonality between these tools is that they all seek to provide the educator with a vehicle by which to observe, record, and evaluate what the child can do. It is these positive, observable behaviors -- the "can do's" -- which are the most reliable indicator of the deaf-blind child's functioning level.

The covert behaviors of the deaf-blind child are a direct reflection of the varied systems which serve to provide the child with a means of gathering and storing information about himself and the world around him. These systems of behavior, as described by Hammer (1974:7), are, 1) physical; 2) social; 3) emotional; and 4) mental. All systems are interrelated. They provide a basic framework in which behaviors may be observed and described.

The physical system of behavior includes the areas of perception and motor development. An impairment to either of these areas will have an obvious effect on the child's ability to learn and progress. Also included in the physical system is the child's level of maturation, his ability to thrive, and his nutrition (Hammer, 1974:7). If the child is in poor health, or if he is not receiving adequate protein, vitamins and other nutrients, it is unlikely that he will ever develop to his maximum potential. Attention span will be brief, strength and endurance will be limited, irritability and behavior problems will be common, and absences from the classroom will be frequent.

The social system of behavior reflects the child's ability to understand and relate to the world in which he lives. In children this behavior is best observed in patterns of play. Play may be divided into three distinct levels: isolated, parallel, and interactive. The deaf-blind frequently demonstrates an overlapping of function between two levels.

At the isolated level of play, the child prefers to be alone. He may actively resist or passively accept any imposed contact with others. This is a time for the child to test the world in which he lives through tasting, touching, and bringing in information on a very primitive basis (Hammer, 1974:7). It is important that a child who is functioning at this level of play be allowed the opportunity to develop a primary relationship with one person rather than being "thrust" into contact with many different individuals.

Parallel play is shown in children who are aware of other people in their environment, although they do not always acknowledge their existence. They may seek to do the same types of activities as others (play, eat, etc.), but without any attempt at cooperation or working together. At this stage of social development, the deaf-blind child may use people as "objects" to fulfill his needs (he may lead an adult to a high cabinet to obtain a favored toy or he may prompt a larger child to push open a heavy door when he wishes to leave the room).

The child who demonstrates interactive play activities will initiate contact with adults and other children. He will want to take part in the activities of others. This child will imitate the behaviors and mannerisms of people with whom he comes in contact. At an advanced point in this stage, he will share and take turns.

The third system of behavior is the emotional. This system reflects the child's ability to perceive of himself as being unique and separate from others. Included also in this area is the child's ability to express his feelings, wants, and needs and to receive the emotional signals of others. He learns to cope with life situations (Hammer, 1974:7).

The final system in which the behaviors of deaf-blind children may be observed is the mental. This does not refer to IQ scores, which are most frequently obtained from tests which are not designed to measure the performance of a child with a multisensory deficit. Mental behavior does reflect the child's ability to solve a problem, to evaluate, and to learn by trial and error. It is demonstrated by the child who stumbles over an object in his path and then walks around it in subsequent encounters. In addition to memory, this system also included the child's ability to put together past information in order to generate new activity.

The deaf-blind child's level of functioning within each system of behavior may be appraised in different ways. Developmental assessment and the recording (and subsequent evaluation) of the child's behavior in a variety of carefully delineated settings are two techniques frequently employed. A different technique, discussed by Hammer (1974:7), concerns the appraisal of the processes by which a learner moves from a level of dependency to a level of independent function. It is the premise of this technique that learning does not begin at the skills level: it begins at the functional level which precedes the skill to be taught. In other words, if a child is not able to demonstrate the process of learning a function, it is not relevant to teach the related skill before the process has been fully developed.

The processes of organization of behaviors follow a heirarchy outlined by Whepman (1960, in Hammer, 1974:7) which corresponds with the organization of the development of the central nervous system. These processes, beginning at the most basic level, are:

1) sensory input
2) motor output
3) perception
4) imitation
5) concepts
6) language
7) thoughts
8) ideas

The deaf-blind child progresses up the heirarchy of processes as he acquires greater independent functioning in each of the systems of behavior. These processes provide the means by which the child can organize information taken in through the various systems.

At the sensory input level, the child is the passive receiver of sensory stimuli. Once the child makes either a reflexive or voluntary motor response to the sensory input, he progresses to the motor output level of processing. Perception is observed when repeated sensory inputs emerge into a pattern of recognition. The child is able to discriminate between stimuli. Imitative behaviors provide for the observation of perceptual input. Concepts are formed once the child is able to call upon past sensory, motor, and perceptual behaviors to generate new activities. The concepts, in turn, may be measured on the output side through language, thoughts, and ideas. (Hammer, 1974:7) The deaf-blind child's level of functioning may be assessed by determining which processes of organization are demonstrated in each of the systems of behavior. Activities based upon this type of assessment would then begin at the functioning or process level which precedes the skills needed to be taught.

In the course of determining a given deaf-blind child's level of functioning, the educator may observe that child demonstrating "inappropriate" or stereo-typed behaviors (spinning, rocking, eye poking, filtering light sources through his hand, etc.) Although the first inclination on the part of the educator would be to stop these behaviors, extreme caution should be exercised. Rather than being signs of a strictly emotional disorder, many of these behaviors have proven to be pathogenic in origin (Desmond, 1967 and Vernon, 1967). Often they are a direct outgrowth of the central nervous system damage experienced by the child.

PRIMARY CONSIDERATION IN PROGRAM PLANNING

Once it has been determined what a given child can do, goals and objectives need to be set to meet that child at his level of functioning. In establishing a daily routine, emphasis should be placed upon developing the total child and not on isolated skills. As mentioned earlier in this paper, cell systems of behavior are interrelated (language doesn't occur only from 9-10 a.m.; hearing only from 10-11 a.m.; vision only from 2-3 p.m., etc.). Activities should reflect integrated goals which take into account several systems of behavior. Skills are an outgrowth of the child's total development. Train the child and the skills will follow.

A multi-sensory approach to the presentation of new tasks will often assist the deaf-blind child in the initial stages of learning. An object which the child is allowed to see, feel, hear, and taste will be more meaningful for him than one which he is only allowed to see. By initiating an activity with a multisensory approach, reducing the stimulation to the processes to be taught, and then returning to a multisensory approach at the very end of the activity, the educator allows the child to experience that activity in the most complete way possible.

The deaf-blind child has a need for structure. He functions best when dealing with the conrete rather than with the abstract. A relevant daily routine helps to provide this structure. By following a consistent routine, the child can learn to anticipate activities and events. Hence, things become less scary and more organized for him; thus facilitating and learning.

Relevance in the deaf-blind child's daily routine pertains to timing as well as to activities. Activities should be relevant to the child in the context of his environment. The child may be able to acquire the skill of color-sorting inch cubes into plastic margerine tubs, but how relevant is this activity to his life? If the child is to learn to discriminate between colors, perhaps the use of socks, shirts, toys, cups, bedspreads or other items found in his environment would be far more meaningful to him.

The time of day during which an activity occurs should also be relevant to the child. In order to be meaningful, symbols need to be taught to the child in a situation in which he is involved in the total event. Events should take place at a time which would correspond to the child's regular "home" routine. Dressing skills should be taught in the morning before class, in conjunction with toileting, when removing clothes for tactile stimulation, etc. Feeding would be taught at lunch and snack time; appropriate play would be taught during recess or free play; learning to set a table would occur prior to serving lunch "family style"; and so on. Consideration should always be given to the ease by which the activities planned for the child at school can be carried over and internalized in the home or in the dormitory.

If the child is to internalize an activity, he must first be allowed time and opportunity during the day for:

1) task generalization to other situations
2) spontaneity of application of skills learned

SUGGESTIONS FOR MOTIVATING THE CHILD

The challenge in motivating the deaf-blind child and in modifying his behavior lies in trying to raise his level of performance to that of a smoothly running organism. (Lent, 1970) If a child is highly motivated by an activity or an event, not only will he be more inclined to demonstrate positive performance, but he will also be more likely to carry over the activity into other situations and to demonstrate related spontaneous behaviors. Hopefully the profession has moved beyond the point of feeling that if only a program had enough M & M's it could motivate

children to change their behavior. M & M's are not a panacea. Light, vibration, and even social praise have often proven to be much stronger reinforcers for this population. Many children do not like sweets and, even if they do, their nutrition should take a much higher precedence over their taste.

In selecting reinforcers by which to motivate the child toward higher levels of function, the educator should pay close attention to what already turns the child on. Reinforcers should be selected based upon what the individual child thinks is good, not what we, the educators, decide is good. Although it is often extremely difficult to find a "turn on" for deaf-blind children, it should be remembered that there is always a reason (payoff) for everything a child does. (Norris, 1975) A variety of potential rewards should be made available to the child and a record kept of those objects or events to which he returns. The child's responses to events which routinely occur in the environment should also be noted. Parents may be able to provide valuable information on items outside of the classroom which motivate their child. "Outside" observers may also prove helpful in identifying positive reinforcers.

Some reinforcers frequently mentioned by teachers as being effective for motivating their deaf-blind students include:*

1. light (especially colored light, or light shone through cellophane or color paddles)
2. textures (soft, fuzzy, or feathery)
3. air (squeezed from an empty liquid detergent bottle or blown from a battery operated fan)
4. vibration (from a hand-held vibrator or other mechanical source or from the adult model's throat in voice production)
5. sound (music from a radio, piano, or record player; toys that make noise)
6. movement (toys that move, soap bubbles blown in the air, or the child's own movement in space)
7. trampoline (bouncing with adult supervision)
8. social (praise, tickling, patting, clapping, or rubbing)
9. free time (time offered the child to do whatever he wants contingent upon positive performance)

The deaf-blind child needs to learn the consequences of his behavior. It is of extreme importance that any reinforcer selected for a given child be applied consistently to that child by all persons with whom he comes in contact. A positive reinforcer should be the outcome of a positive behavior. In order for the child to learn to repeat positive behaviors, he must clearly understand which of his behaviors are being reinforced.

CONSIDERATIONS IN THE SELECTION OF CLASSROOM MATERIALS

"The best materials in life are free" reflects that often the materials which are most relevant to the deaf-blind child are already present in his own environment. Those materials with which the child routinely has frequent contact (his clothing, his favorite toys or objects, his eating utensils, the furniture in his classroom, etc.), will be far more

*Food and drink have been purposely ommitted from this list due to their potential detrimental effect on the child's nutrition and total feeding program.

concrete and relevant for him than obtruse or unfamiliar materials (form boards, stacking rings, blue plastic airplanes, rubber form animals, etc.). Although these latter items may serve a purpose in the development of abstract thought processes, it should be questioned as to just how meaningful they are to the deaf-blind child in his everyday interaction with his "world". Shamafelt (1974) recommends that the educator ask himself four basic questions prior to selecting any new material for a deaf-blind child:

1. With the use of this material, will the child learn a skill or will he learn a concept?
   The child may be conditioned to manipulate the materials and give the correct response without ever learning the concept the educator is trying to teach. (Ex: he may learn to sign "shoe" when a plastic shoe is placed before him on a table and still be unable to label the shoe on his own foot, the teacher's foot, or another child's foot.) A skill should not continue to be taught just because a child is making progress with it. If a child is unable to transfer that skill to situations meaningful to him, it is essential that the materials used be altered or dropped, if that child is to progress.
2. Are we challenging the child or frustrating him?
   Are the materials too high-level for the child? (Ex: should a child who does not demonstrate manual reach-grasp-release be expected to stack inch cubes?) Are the materials too low level for the child? Is the child frustrated and refusing to perform because, after having demonstrated the facility with which he could complete a task, we demand that he meet 100% criterion on seventy-five trials over ten consecutive days?
3. Are we planning for where the child is or where he should be for his chronological age?
   Materials should be selected which are appropriate to a child's level of functioning. Choose materials based upon where a child is not where he should be.
4. Are we concentrating on what he can't do or what he can do?
   Training should begin with materials which the child can already begin to manipulate and progress from there. Does it make sense to try to teach a child to cut with a pair of scissors along a straight line, when he has proven unable to visually track an object along the horizontal and vertical planes?

THE CHILD AND HIS ENVIRONMENT

The structure of the learning environment plays an important role in the management of the deaf-blind child's behavior. In order for the child to progress at an optimal rate, his environmental needs must be met. Norris (1975) and Hammer (1975) suggest six possible avenues which might be taken by the educator to identify the child's needs.

1. Observe how the child spontaneously interacts with his environment. Record behaviors which the child demonstrates without adult supervision: a) in the home or dorm before and after school; b) in the classroom; c) on the playground; and d) in the community. Data on how the child spontaneously takes in

information will prove valuable when structuring the introduction of new materials or tasks for him.

2. Identify the child's best functioning space. Where does he prefer to be? Some deaf-blind children feel more comfortable on the floor or in a corner against a wall rather than in a chair with their legs dangling in space. If the child spontaneously seeks out small defined areas, his learning will probably not be facilitated by starting him out in a large open space. What is taught and how it is taught is far more important than where it is taught.
3. Start where the child is and where he needs to be. This pertains to all aspects of each activity attempted. If a child consistently turns his head to either side, whenever material is presented, it may be an indication that his residual vision is primarily in the peripheral areas. Would it make sense to have this child look "straight" at the materials or give "good eye contact" if he is lacking central vision?
4. Consider the effects of all outside stimuli on the child. Distracting stimuli should always be kept to a minimum in initial training. If the child consistently watches the activities of others, rather than attending to task before him, he may need to be partitioned off by a screen or turned to face the wall in order to reduce visual distractors. Tactile, auditory, gustatory, and olfactory stimuli may also disturb or distract the child. If a child is trying to rid his mouth of an undesired toothpaste taste, he will probably not be too prone to attend to the scheduled learning activity.
5. Provide the child with a learning atmosphere in which to develop alternative behaviors. Let him explore and try things out on his own. Make materials used by the child during different times of the day, available to him in an unstructured setting in order that he might be allowed the opportunity to generalize and initiate new activities.
6. Allow the child to organize his world without adult management. Provide him with the opportunity to manage his own behaviors. Let the child go.

SUMMARY

Learning, as presented in this paper, is a process of moving from a level of dependent function to a level of independent function. In order to enable the deaf-blind child to become the eventual independent manager of his own behavior, the educator must:

1. Recognize that the deaf-blind child is first a child and then a child who has a problem.
2. Understand that what works for a given child today may or may not work for that same child tomorrow. Be flexible.
3. Identify where the deaf-blind child is functioning - socially, emotionally, physically, and mentally.
4. Plan appropriate programs of intervention which are relevant to the total child in the context of his environment.
5. Consistently apply positive reinforcement procedures selected from those for which the child has already indicated a desire.

6. Select meaningful materials which will help to teach the child a concept rather than a skill.
7. Structure the learning environment to meet the individual needs of the child.
8. Start where the child is and let him take you where he will go.

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